Energy 1

① $W = Fd = (800)(40) = \boxed{32\,000\ J}$

② $W = F_g \cdot d = (60)(9.8)(10) = \boxed{5\,880\ J}$

③ $W = F_g \cdot d = (34)(15) = \boxed{510\ J}$

④ $W = F_g \cdot d = (49)(9.8)(10) = \boxed{4802\ J}$

⑤ Work per brick:

$W = F_g \cdot d = (150)(8) = 1200\ J$

a) # of bricks in 10 min:

$2 \times 10 = 20$

Total work done:

$20 \times 1200 = \boxed{24\,000\ J}$

b) # of bricks in 1 hour:

$2 \times 60 = 120$

Total work done:

$120 \times 1200 = \boxed{144\,000\ J}$

⑥ a) $W = F_g \cdot d = (100)(9.8)(5) = \boxed{4900\ J}$

b) # of times lifted in 1 min:

$\frac{60}{10} = 6$

Total work:

$6 \times 4900 = \boxed{29\,400\ J}$

⑦ $W = Fd\cos\theta$

$= (600)(15)\cos 46$

$W = \boxed{6251.9\ J}$

⑧ $W = Fd\cos\theta$

$= (40)(50)\cos 45$

$W = \boxed{1414.2\ J}$

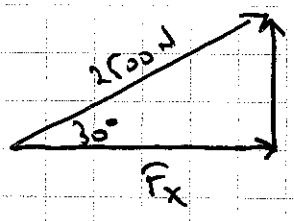
⑨ $W = Fd\cos\theta$

$12000 = (120)(200)\cos\theta$

$0.5 = \cos\theta$

$\theta = \cos^{-1}(0.5) = \boxed{60°}$

(10) a)



$\cos 30 = \frac{F_x}{2500}$

$F_x = 2500 \cos 30$

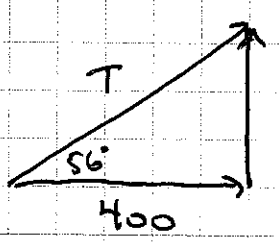
$F_x = \boxed{2165.1 \text{ N}}$

b) $W = F_x \cdot d$

$= (2165.1)(200)$

$W = \boxed{433\,012.7 \text{ J}}$

(11) a)



$\cos 56 = \frac{400}{T}$

$T = \frac{400}{\cos 56} = \boxed{715.3 \text{ N}}$

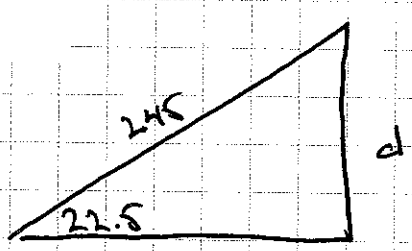
b) $W = Fd$

$= (400)(25)$

$W = \boxed{10\,000 \text{ J}}$

(12) $W = F_g \cdot d = (0.95)(2) = \boxed{1.9 \text{ J}}$

(13)



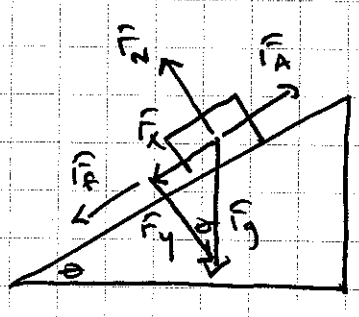
$$\sin 22.5 = \frac{d}{245}$$

$$d = 245 \sin 22.5 = 93.757 \text{ m}$$

a) $W = F_g \cdot d = (1000)(9.8)(93.757)$

$$= \boxed{918\,822.9 \text{ J}}$$

b)



$$\Sigma F = \vec{F}_A - \vec{F}_x - \vec{F}_f$$

$$0 = F_A - mg\sin\theta - \mu mg\cos\theta$$

$$0 = \vec{F}_A - (1000)(9.8)\sin 22.5 - (0.3)(1000)(9.8)\cos 22.5$$

$$0 = F_A - 6466.5$$

$$F_A = 6466.5 \text{ N}$$

$$W = \vec{F}_A \cdot d$$

$$= (6466.5)(245)$$

$$W = \boxed{1\,584\,293.3 \text{ J}}$$

Note: $d = 245$ m because $\vec{F}$ and d must be in the same direction.

(14) $W = F_g \cdot d_1 + F_g \cdot d_2 + F_g \cdot d_3 + \ldots + F_g \cdot d_8$

$= F_g \cdot (d_1 + d_2 + d_3 + d_4 + \ldots + d_8)$

$= F_g (0 + 0.06 + 0.12 + 0.18 + 0.24 + 0.30 + 0.36 + 0.42)$

$= F_g (1.68)$

$= (1.2)(9.8)(1.68)$

$W = \boxed{19.8 \text{ J}}$

(15) W = area

a) $W = \frac{1}{2}(3)(400) + (4)(400) + \frac{1}{2}(3)(400)$

$W = \boxed{2800 \text{ J}}$

b) $W = 2800 + \frac{1}{2}(2)(-200) + (2)(-200) + \frac{1}{2}(1)(-200)$

$W = \boxed{2100 \text{ J}}$